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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,337	03/29/2004	Bill J. Peck	10040506-1	5083

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EXAMINER	
FORMAN, BETTY J	
ART UNIT	PAPER NUMBER
1634	

NOTIFICATION DATE	DELIVERY MODE
02/15/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IPOPS.LEGAL@agilent.com

Office Action Summary	Application No.	Applicant(s)	
	10/813,337	PECK ET AL.	
	Examiner	Art Unit	
	BJ Forman	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24 and 26-28* is/are pending in the application.

4a) Of the above claim(s) *17-24 26-28* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 31 August 2007 has been entered.

Status of the Claims

2. This action is in response to papers filed 31 August 2007 in which claims 1, 10, 11 were amended. The amendments have been thoroughly reviewed and entered.

The previous rejections in the Office Action dated 11 May 2007 under obviousness-type double patenting are withdrawn in view of the Terminal Disclaimers filed 11 July 2007. The previous rejections under 35 U.S.C. 103(a), not reiterated below, are withdrawn in view of the amendments.

Applicant's arguments have been thoroughly reviewed but are deemed moot in view of the amendments, withdrawn rejections and new grounds for rejection. New grounds for rejection are discussed.

Claims 1-16 are under prosecution.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4, 12-13, 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Bass et al (U.S. Patent No. 6,420,180, issued 16 July 2002).

Regarding Claim 1, Bass et al disclose a method of producing an array of at least two different polymers covalently bonded to a surface (Column 7, lines 20-24), the method comprising contacting blocked monomer to a first and second location of a surface having functional groups (Column 13, lines 35-57), to produce covalently linked monomers, removing blocking groups of the monomers without exposing the surface to triple phase interphase gas, solid liquid (e.g. all additional steps are performed in flood station #68, Column 7, line 20-Column 9, line 9) and reiterating the steps to produce an array having at least two polymers at the first and second locations.

The instant claims define the method using a negative limitation i.e. absence of triple phase interphase at the surface. The instant specification provides a preferred embodiment resulting in the absence of the triple phase (¶ 104). However, the specification does not limit the claimed methods to that preferred embodiment. The claims merely limit the step of removing blocking groups such that the surface is not exposed to a triple phase interphase. Bass et al does not teach a triple phase interphase and there is not indication that such a condition would result using the flood station. The preceding rejection is based on judicial precedent following In re Fitzgerald, 205 USPQ 594 because Bass et al is silent with regard to absence of a triple phase. However, the property as recited in Claim 1 is deemed to be inherent in the teaching of Bass because there is no indication that a triple phase would be present using the flood station.

The burden is on applicant to show that the claimed absence of a triple phase is different from that of Bass.

Regarding Claim 2, Bass et al teach the method wherein the functional group generation step comprises sequentially contacting at least a portion of the surface with different liquids (Column 8, lines 57-Column 9, line 9).

Regarding Claim 3, Bass et al teach the method different liquids includes an oxidizing liquid and deblocking liquid (Column 8, lines 57-Column 9, line 9).

Regarding Claim 4, Bass et al teach the method different liquids includes a washing liquid (Column 8, lines 57-Column 9, line 9).

Regarding Claim 12, Bass et al teach the method wherein the functional group generation step occurs in a flow cell i.e. flood station (Column 8, lines 57-Column 9, line 9).

Regarding Claim 13, Bass et al teach the method wherein the monomers are deposited using a pulse-jet (Column 4, line 44-Column 8-Column 9, line 9).

Regarding Claim 28, Bass et al teach the method wherein the substrate is planar (Fig. 1).

5. Claims 1-4, 12, 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Gamble et al (U.S. Patent No. 5,981,733, issued 9 November 1999).

Regarding Claim 1, Gamble et al disclose a method of producing an array of at least two different polymers covalently bonded to a surface (Column 3, lines 25-43), the method comprising contacting a blocked monomer to a first and second location of a surface having functional groups (e.g. first monomer previously attached, Column 12, lines 18-30), to produce covalently linked monomers, removing blocking groups of the monomers without exposing the surface to triple phase interphase gas, solid liquid and reiterating the steps to produce an array having at least two polymers at the first and second locations (Column 12, line 18-Column 13, line 57).

The instant claims define the method using a negative limitation i.e. absence of triple phase interphase at the surface. The instant specification provides a preferred embodiment resulting in the absence of the triple phase i.e. "the substrate surface is not contacted with gas during the functional group generation step" (¶ 104). It is noted that the specification does not limit the claimed methods to that preferred embodiment.

Gamble et al specifically teaches a wash step following the step of functional group generation (Column 12, line 59-Column 13, line 10) and therefore teaches the absence of a triple phase interphase as defined in the instant specification (¶ 104).

Regarding Claim 2, Gamble et al teach the method wherein the functional group generation step comprises sequentially contacting at least a portion of the surface with different liquids (e.g. deprotectant and wash, (Column 12, line 59-Column 13, line 10).

Regarding Claim 3, Gamble et al teach the method different liquids includes an oxidizing liquid and deblocking liquid (Column 12, line 59-Column 13, line 40).

Regarding Claim 4, Gamble et al teach the method different liquids includes a washing liquid (Column 12, line 59-Column 13, line 10).

Regarding Claim 12, Gamble et al teach the method wherein the functional group generation step occurs in a flow cell (Column 3, lines 44-58; Column 5, line 65-Column 6, line 2; and Column 13, lines 15-30).

Regarding Claim 28, Gamble et al teach the method wherein the substrate is planar (Column 12, line 26-28).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-12, 14-16 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamble et al (U.S. Patent No. 5,981,733, issued 9 November 1999) in view of Anderson et al (U.S. Patent No. 5,186,824, issued 16 February 1993).

Regarding Claim 1, Gamble et al disclose a method of producing an array of at least two different polymers covalently bonded to a surface (Column 3, lines 25-43), the method comprising contacting a blocked monomer to a first and second location of a surface having functional groups (e.g. first monomer previously attached, Column 12, lines 18-30), to produce covalently linked monomers, removing blocking groups of the monomers without exposing the surface to triple phase interphase gas, solid liquid and reiterating the steps to produce an array having at least two polymers at the first and second locations (Column 12, line 18-Column 13, line 57).

The instant claims define the method using a negative limitation i.e. absence of triple phase interphase at the surface. The instant specification provides a preferred embodiment resulting in the absence of the triple phase i.e. "the substrate surface is not contacted with gas during the functional group generation step" (¶ 104). It is noted that the specification does not limit the claimed methods to that preferred embodiment.

Gamble et al teach the method of array fabrication wherein a plurality of different liquids sequentially contact the substrate within a flow cell to synthesis different polymers on the surface (Column 3, lines 44-58; Column 5, line 65-Column 6, line 2; and Column 13, lines 15-30). Gamble does not specifically teach the liquids include a capping reagent or differing densities of the solutions such that the plurality of different liquids displace the previous liquid forming a stratified liquid interface between the liquids.

However capping reagents and applying solutions using a stratified liquid interface were well known and routinely practiced in the art of polymer synthesis at the time the claimed invention was made as taught by Anderson et al.

Anderson et al teach a similar method of producing an array of at least two different polymeric ligands (e.g. oligonucleotides synthesized on a solid support (e.g. particle, membrane, disc Column 6, lines 49-56) wherein the method comprises contacting a blocked monomer at first and second locations having functional groups (e.g. cpg supports having the first monomer attached, Column 19, lines 55-58) under conditions sufficient for the monomer to covalently bond to the surface, removing blocking groups to generate a function group and reiterating the steps to produce the array of at least two ligands (Column 19, line 55-Column 20, line 50). Anderson et al further the method wherein the solid supports are exposed to reagents sequentially wherein the reagents are kept separate based on density (Column 5, lines 3-38 and Column 6, lines 13-36) forming a liquid-liquid interface such that the solid support is not exposed to a triple phase interface (Column 12, lines 28-67 and Fig. 2A-2D). Anderson et al disclose the method wherein the functional group generation comprises sequentially contacting at least a portion of the surface with a plurality of liquids (Column 6, line 57-Column 7, line 14) wherein the different liquids include at least an oxidizing liquid, a deblocking liquid, a wash liquid, and a capping liquid (Column 13, line 59-Column 14, line 11 and Column 19, line 55-Column 20, line 50).

Anderson et al further teach the method wherein the sequentially applied liquids have a different density greater than zero (i.e. increasing density, Column 6, line 57-Column 7, line 14) wherein the sequential contact is performed by displacing a previous liquid with an immediately subsequent liquid produce a stratified liquid interface that moves across the surface (Column 7, line 60-Column 8, line 3, Column 12, lines 28-67 and Fig. 2A-2D).

Gamble et al specifically teaches sequential flow through the reaction chamber (Column 5, line 65-Column 6, line 2) and further desires separation of reaction reagents (Column 4, line

56-Column 5, line 2). To keep reagents separate, Gamble uses a separate wash station to which the substrate is moved for washing then drying (Column 8, lines 16-28).

Anderson et al also acknowledges that reagent solutions used for polymer synthesis are incompatible (Column 3). To overcome the problems of incompatible reagents, Anderson introduces the reagents at differing densities so as to form a stratified liquid interface moving across the flow cell (Column 5, lines 1-19) thereby eliminating extensive washing between synthesis steps and reducing the waste of expensive reagents (Column 3, lines 54-59).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the fluid displacement synthesis of Anderson et al to the polymer synthesis of Gamble et al. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success based on the problems using incompatible reagents as taught by Anderson et al (Column 3, lines 54-59) and for the benefit of eliminating the intervening washing (and substrate movement) in the method of Gamble and thereby reducing waste of time and expensive reagents. One of ordinary skill would have been further motivated to apply the sequential application of synthesis reagents using displacing fluids of differing densities as taught by Anderson to the method of Gamble so as to maintain separation between incompatible reagents with precise control and timing (Column 5, lines 1-38).

Regarding Claim 10-11, Anderson et al disclose a method of producing an array of at least two different polymeric ligands (e.g. oligonucleotides synthesized on control pore glass, the two different sequences being e.g. product and failed sequences, Column 20, lines 10-25).

Anderson et al disclose the method comprising contacting a blocked monomer at first and second locations having functional groups (e.g. cpg supports having the first monomer attached, Column 19, lines 55-58) under conditions sufficient for the monomer to covalently bond to the surface, removing blocking groups to generate a function group and reiterating the steps to produce the array of at least two ligands (Column 19, line 55-Column 20, line 50). Anderson et al teach the method wherein the solid supports are exposed to reagents

sequentially wherein the reagents are kept separate based on density (Column 5, lines 3-38 and Column 6, lines 13-36) forming a liquid-liquid interface such that the solid support is not exposed to a triple phase interface (Column 12, lines 28-67 and Fig. 2A-2D).

Anderson et al further teach the method wherein the flow rate is controlled and monitored during passage of reagents (Column 5,lines 25-27; Column 14, lines 44-53 21) and further teach that it is important to control the flow rate because some synthesis steps take more or less time than other steps and because reagent waste resulting from excess use of reagents is expensive (Column 21, lines 30-65) but they are silent regarding specific flow rates. However, the reference clearly suggests that the flow rate is adjusted to maximize reagents and synthetic step. Therefore, It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to adjust the flow rate during the synthesis steps of Anderson to obtain optimal flow rates (e.g. about 1-20 cm/x). One of ordinary skill in the art would have been motivated to do adjust the flow rate so as to maximize syntheses reaction with minimal waste of reagents as desired by Anderson et al (Column 21, lines 30-65).

Regarding Claim 14, Gamble et al teach the method wherein reagents are sequentially applied to the substrate (Column 5, line 65-Column 6line 2) wherein the reagents include oxidizing liquid, washing liquid and deblocking liquid (Column 12, line 59-Column 13, line 40), lines 40-44) but does not specifically teach displacing fluids. However, Anderson et al teach the method wherein functional group generation comprising contacting the surface in a flow cell with a plurality of different liquids in the following order: oxidizing, wash, deblock, wash wherein the liquids are contacted sequentially by displacing the previous liquid (Column 7, line 60-Column 8, line 3 and Column 12, lines 28-67 and Fig. 2A-2D and (Column 19, line 55-Column 20, line 50) whereby reagents at differing densities form a stratified liquid interface moving across the flow cell (Column 5, lines 1-19) thereby eliminating extensive washing between synthesis steps and reducing the waste of expensive reagents (Column 3, lines 54-59).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the fluid displacement synthesis of Anderson et al to the polymer synthesis of Gamble et al. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success based on the problems using incompatible reagents as taught by Anderson et al (Column 3, lines 54-59) and for the benefit of eliminating the intervening washing (and substrate movement) in the method of Gamble and thereby reducing waste of time and expensive reagents. One of ordinary skill would have been further motivated to apply the sequential application of synthesis reagents using displacing fluids of differing densities as taught by Anderson to the method of Gamble so as to maintain separation between incompatible reagents with precise control and timing (Column 5, lines 1-38).

Regarding Claim 15, Anderson et al disclose the method wherein the sequential contact is by displacing a previous liquid with an immediately subsequent liquid (Column 7, line 60-Column 8, line 3 and Column 12, lines 28-67 and Fig. 2A-2D).

Regarding Claim 16, Anderson et al disclose the method further comprising contacting a capping liquid which is contacted with the surface between an oxidizing liquid and deblocking liquid (Column 19, line 55-Column 20, line 50).

Regarding Claim 28, Gamble et al teach the method wherein the substrate is planar (Column 12, lines 26-28) and Anderson et al disclose the method wherein the substrate is a planar substrate e.g. "flat discs", Column 6, lines 49-52).

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gamble et al (U.S. Patent No. 5,981,733, issued 9 November 1999) in view of Anderson et al (U.S. Patent

No. 5,186,824, issued 16 February 1993) as applied to Claim 1 above and further in view of Bass et al (U.S. Patent No. 6,420,180, issued 16 July 2002).

Regarding Claim 13, all elements of Claim 1 are discussed above. Gamble et al also teach the method wherein synthesis reagents are applied using a pulse jet (Column 12, lines 52-55) but does not teach the monomers are deposited using the pulse jet.

Bass et al teach a similar method of producing an array of at least two different polymers covalently bonded to a surface (Column 7, lines 20-24), the method comprising contacting blocked monomer to a first and second location of a surface having functional groups (Column 13, lines 35-57), to produce covalently linked monomers, removing blocking groups of the monomers without exposing the surface to triple phase interphase gas, solid liquid (e.g. all additional steps are performed in flood station #68, Column 7, line 20-Column 9, line 9) and reiterating the steps to produce an array having at least two polymers at the first and second locations wherein the monomers are deposited using pulse jet deposition whereby each jet is dedicated to a defined monomer thereby reduces movement of deposition device and amount of monomer consumed with each deposition (Column 10, lines 18-22 and Column 12, lines 25-48). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the monomer deposition via inkjet as taught by Bass et al to the polymer synthesis of Gamble. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success and for the benefit of reducing the amount of monomer regent used in a deposition step. Gamble adds the monomer via flowing a phosphoramidite solution into the reaction chamber so as to uniformly cover the entire substrate (Column 13, lines 16-30). Bass et al deposits as little as less than a pL monomer solution (Column 10, lines 17-21). Hence, one of ordinary skill would have been motivated to use the inkjet for monomer deposition as taught by Bass in the polymer synthesis of Gamble to thereby reduce the cost of expensive monomer reagents.

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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